



IFW/ 2811

PATENT APPLICATION  
Docket No: 14321.67

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of )  
 )  
 Nobuhiro Nunoya et al. )  
 )  
 Serial No.: 10/527,355 ) Art Unit  
 ) 2811  
 Filed: March 7, 2005 )  
 )  
 Confirmation No.: 4938 )  
 )  
 For: OPTICAL SEMICONDUCTOR DEVICE AND OPTICAL )  
 SEMICONDUCTOR INTEGRATED CIRCUIT )

CERTIFICATE OF DEPOSIT UNDER 37 C.F.R. § 1.8

I hereby certify that the following documents are being deposited with the United States Postal Service as First Class Mail, postage prepaid, in an envelope addressed to: Commissioner for Patents, PO Box 1450, Alexandria, Virginia 22313-1450, on the 4<sup>th</sup> day of August 2006.

- Transmittal for Third Supplemental Information Disclosure Statement (3 pages)
- Third Supplemental Information Disclosure Statement (3 pages)
- Form PTO-1449 listing 7 references (2 pages)
- A copy of 5 Non-US references listed on the Form PTO-1449
- A copy of Supplementary European Search Report for No. EP 04724370.4
- Postcard

Respectfully submitted,

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### TRANSMITTAL FOR THIRD SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT

Commissioner for Patents  
 P.O. Box 1450  
 Alexandria, VA 22313-1450

Sir:

Transmitted herewith for filing and pursuant to 37 C.F.R. § 1.97 is a Third Supplemental Information Disclosure Statement, which includes the following statements, if any, required variously by 37 C.F.R. § 1.98:

- ☒ Statement of relevance of selected cited references not in the English language which are not translated.  
☐ Statement that selected cited references are substantially cumulative of an enclosed or previously submitted reference.  
☐ Statement that selected cited references were previously cited by or submitted to the United States Patent and Trademark Office in a prior application which is relied upon for an earlier filing date under 35 U.S.C. § 120.

A. Additional Materials Required Due to Content of Information Disclosure Statement

Transmitted are the following documents in addition to the Information Disclosure Statement as required variously under 37 C.F.R. § 1.98:

- ☒ Form PTO-1449 listing 7 references submitted for consideration.
- ☒ A copy of 5 Non-US references listed on the Form PTO-1449.
- ☐ English translations of three (3) of the references listed on the Form PTO-1449 which are not in the English language.
- ☐ Copies of the following documents from the prosecution of a previous, related application:
  - ☐ Form PTO-1449 AND INFORMATION DISCLOSURE STATEMENT; and
  - ☐ Form PTO-892

B. Additional Materials Required Due to Timing of Filing of Information Disclosure Statement

The transmitted Supplemental Information Disclosure Statement is being filed within one (1) of the following four (4) time periods:

- I. ☒ Prior to the later of either three (3) months following the filing date or the mailing of a first Office Action. Accordingly, no materials other than those listed above are enclosed.
- II. ☐ Following the latter of either three (3) months following the filing date or the mailing of a first Office Action, but before the mailing of a final Office Action or a Notice of Allowance. Accordingly, to secure consideration thereof, one (1) of the following is also enclosed:
  - ☐ Promptness Certification; or
  - ☐ Check No. \_\_\_\_\_ in the amount of \_\_\_\_\_ constituting the submission fee set forth in 37 C.F.R. § 1.17(p).
- III. ☐ After the mailing of a Notice of Allowance, but before payment of the Issue Fee. Accordingly, in order to secure consideration thereof, each of the following are also enclosed:
  - ☐ Promptness Certificate;
  - ☐ Petition for Consideration; and

- Check No. in the amount of \_\_\_ constituting the petition fee set forth in 37 C.F.R. § 1.17(i)(1).
- IV. — After payment of the Issue Fee. Accordingly, in order to secure consideration thereof, each of the following are also enclosed:
- Petition to Withdraw from Issue; and
- Check No. \_\_\_ in the amount of \_\_\_ constituting the petition fee set forth in 37 C.F.R. § 1.17(i)(1).

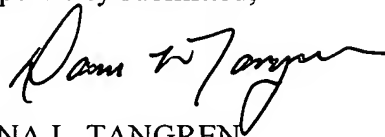
C. Fees

The Commissioner is hereby authorized to charge payment of or any deficiency in the following fees associated with this communication, or to credit any overpayment thereof, to Deposit Account No. 23-3178. A duplicate copy of this letter is enclosed.

- X Any fee required in relation to filing of this letter or any documents transmitted therewith.
- The submission fee set forth in 37 C.F.R. § 1.17(p) in the event that 37 C.F.R. § 1.97(c) applies and the Examiner is not satisfied that any Promptness Certificate submitted meets the requirements of 37 C.F.R. § 1.97(e).
- The submission fee set forth in 37 C.F.R. § 1.17(p).
- The petition fee set forth in 37 C.F.R. § 1.17(i)(1).

Dated this 4<sup>th</sup> day of August 2006.

Respectfully submitted,



DANA L. TANGREN  
Attorney for Applicant  
Registration No. 37,246  
Customer No. 022913  
Telephone No. 801.533.9800



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	OPTICAL SEMICONDUCTOR INTEGRATED CIRCUIT)	)

THRID SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT  
UNDER 37 C.F.R. § 1.97

Commissioner for Patents  
PO Box 1450  
Alexandria, Virginia 22313-1450

Sir:

Please find, pursuant to 37 C.F.R. § 1.98(a)(1), the enclosed Form PTO-1449 which contains a list of all patents, publications, or other items that have come to the attention of one or more of the individuals designated in 37 C.F.R. § 1.56(c). While no representation is made that these references may be "prior art" within the meaning of that term under 35 U.S.C. §§ 102 or 103, the enclosed listed references are disclosed so as to fully comply with the duty of disclosure set forth in 37 C.F.R. § 1.56.

Moreover, while no representation is made that a specific search of office files or patent office records has been conducted or that no better art exists, the undersigned attorney of record believes that the enclosed art is the closest to the claimed invention (taken in its entirety) of which the undersigned is presently aware, and no art which is closer to the claimed invention (taken in its entirety) has been knowingly withheld.

In accordance with 37 C.F.R. §§ 1.97 and 1.98, a copy of each of the listed references or relevant portion thereof that is not a US patent document is also enclosed.

Statement of Relevance of References Listed  
Unaccompanied by English Translation  
Under 37 CFR § 1.98(a)(3)

In accordance with 37 CFR § 1.98(a)(3), the following concise explanation of the relevance of each listed reference that is not in the English language and unaccompanied by a translation into English is provided.

Japanese Application No. JP 01-118806: PURPOSE: To improve the coupling efficiency by forming V grooves in the surface of a 1st surface of a transparent body closely to waveguides, reflecting light propagated in the waveguides toward the 2nd surface, and converging the reflected propagated light through a lens and arranging a packaged light receiving and emitting element at the convergence position. CONSTITUTION: There are the waveguides 2, 2a, and 2b near the 1st surface 11 of a substrate and light is propagated. When the light is sent to the waveguide 2 from the left side, it is reflected by an interference filter 6 to enter the waveguide 2a and reaches the V groove 31 and the light is reflected there, converged by the lens 41, and photodetected by the light receiving element 7. Light emitted by the light emitting element 8, on the other hand, is converged into converged light by an internal spherical lens and a lens 42 and the converged light is reflected by a V groove 32 to enter the waveguide 2b, and the light is transmitted through the interference filter 6 and enters the waveguide 2, wherein the light is transmitted to the left. Consequently, the coupling efficiency is improved.

Japanese Application No. JP 62-202583: PURPOSE: To obtain a distributed feedback semiconductor laser with good reproducibility and without increasing a threshold by a method wherein the reflectance of one end surface is predetermined to be or less than a specific percentage and the reflectance of the other end surface is predetermined to be or less than a specific percentage. CONSTITUTION: A mechanism which shifts the phase of a guided light is provided in a distributed feedback semiconductor laser. The product of a coupling coefficient and a resonator length is predetermined to be less than 2. The reflectance of one end surface and the reflectance of the other end surface are predetermined to be more than 5% and less than 15% and to be less than 2% respectively. For instance, an ordinary buried type laser is formed in such a manner that a stripe is so formed as to make the width of an active layer 4, 1.5  $\mu\text{m}$  in a phase shifting region at the center and 1  $\mu\text{m}$  in the other region. The length of the phase shifting region is predetermined to be 30  $\mu\text{m}$  so that the amount of phase shift is to be reduced to a quarter. A laser is cut out of the wafer like this so as to have the resonator length of 150  $\mu\text{m}$  and the reflectance of nearly 0% is provided by cleaving the front and forming an inclined etched surface 8 on the back. In this case, the product of the coupling coefficient and the resonator length is estimated to be approximately 1.

Japanese Application No. JP 63-116485: PURPOSE: To suppress generation of the Fabry-Perot mode by a method wherein a semiconductor substrate is made to have the (110) face, and the laser emission edge face is made to have the (111) face. CONSTITUTION: A diffraction grating 2 is formed on an N-type (110) InP substrate 1. Moreover, an N-type InGaAsP light guide layer 3, a

non-doped InGaP active layer 4, a P-type InP layer 5, and a P-type InGaAsP contact layer 6 are laminated in order on the grating 2. The N-side and P-side ohmic electrodes 7, 8 are formed on the substrate 1 and on the contact layer 6. When the laser oscillator is made to have the direction (001), because cleavage is generated in the face (111), the laser emission edge face (111) 11 has an inclination of 35.3 deg. in regard to the substrate (110). Accordingly, because the laser beam is reflected at the edge face to return to the oscillator is not generated, the Fabry-Perot mode is suppressed.

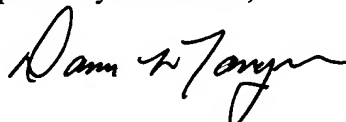
Japanese Application No. JP 01-025586: PURPOSE: To form a photo-semiconductor device of which edge surface reflectance is decreased by slanting the edge surface to form an oblique angle to the direction of stripes. CONSTITUTION: A diffraction grating 4 having a cycle of 238nm and a height of 30nm is formed on an InP substrate 3. The diffraction grating 4 is a so-called phase shift diffraction grating whose cycle of recess and projection is reversed at the center of the device, and is shaped by electron beam exposure. Then InGaAsP guide layer 5, InGaAsP active layer 6, InGaAsP buffer layer 7, P-type InP layer 8 and P-type InGaAsP cap layer 9 are formed successively in multi-layer structure by liquid phase epitaxial method. After this, SiO<sub>2</sub> coating 10 is accumulated onto the surface of the cap layer 9 and the stripe region is selectively eliminated. Then vaporization is conducted to form Au/Cr electrode 11 on the surface and Au/Ga/Ni electrode 12 on the back surface. Au and SiO<sub>2</sub> are eliminated using resist as a protective coat then layers of InP and InGaAsP 3-9 are removed by use of reactive ion beam which contains bromine to form a slanting edge surface 2. It is possible thereby to control a reflectance to less than 0.5% by selecting the angle theta to more than 5 deg..

#### Non-Prior Art References

Enclosed for the Examiner's consideration is a copy of a Supplementary European Search Report dated June 27, 2006 for European Application No. 04724370.4 which relates to the same invention as the present application.

Dated this 4<sup>th</sup> day of August 2006.

Respectfully submitted,



DANA L. TANGREN  
Attorney for Applicant  
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For: OPTICAL SEMICONDUCTOR DEVICE AND OPTICAL SEMICONDUCTOR  
INTEGRATED CIRCUIT

THIRD SUPPLEMENTAL INFORMATION DISCLOSURE  
CITATIONS MADE BY APPLICANT

U.S. Patent Documents

<u>Examiner Initial*</u>	<u>Document Number</u>	<u>Issue Date</u>	<u>Name</u>
____ 1	6,320,888 B1	11/20/2001	Tanaka et al.
____ 2	6,530,698 B1	03/11/2003	Kuhara et al.

Foreign Patent Documents

<u>Examiner Initial*</u>	<u>Document Number</u>	<u>Publication Date</u>	<u>Country or Patent Office</u>	<u>Translation</u>
____ 3	0 790 682 A1	08/20/1997	EP	N/A
____ 4	01-118806	05/11/1989	Japan	No
____ 5	62-202583	09/07/1987	Japan	No
____ 6	01-025586	01/27/1989	Japan	No

Other Documents

(including author, title, pertinent pages, etc.)

Examiner

Initial\*

\_\_\_\_ 7      Abstract of Japanese Patent Publication No. 63-116485, published May 20, 1988.

Examiner:

Date Considered:

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609, draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.



Form PTO-1449

Sheet 2 of 2

Applicant: Nobuhiro Nunoya et al.

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INTEGRATED CIRCUIT

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### References Cited by Applicants

While the filing of Information Disclosure Statements is voluntary, the procedure is governed by the guidelines of Section 609 of the Manual of Patent Examining Procedure and 37 C.F.R. §§ 1.97 and 1.98. To be considered a proper Information Disclosure Statement, Form PTO-1449 shall be accompanied by a copy of each listed patent or publication or other item of information and a translation of the pertinent portions of foreign documents (if an existing translation is readily available to the applicant), an explanation of relevance of each reference not in the English language, and should be submitted in a timely manner as set out in MPEP Sec. 609.

Examiners will consider all citations submitted in conformance with 37 C.F.R. § 1.98 and MPEP Sec. 609 and place their initials adjacent the citations in the spaces provided on this form. Examiners will also initial citations not in conformance with the guidelines which may have been considered. A reference may be considered by the Examiner for any reason whether or not the citation is in full conformance with the guidelines. A line will be drawn through a citation if it is not in conformance with the guidelines AND has not been considered. A copy of the submitted form, as reviewed by the Examiner, will be returned to the applicant with the next communication. The original of the form will be entered into the application file.

Each citation initialed by the Examiner will be printed on the issued patent in the same manner as references cited by the Examiner on Form PTO-892.

The reference designations "A1," "A2," etc. (referring to Applicant's reference 1, Applicant's reference 2, etc.) will be used by the Examiner in the same manner as Examiner's reference designations "A," "B," "C," etc. on Office Action Form PTO-1142.

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Examiner:

Date Considered:

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\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609, draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

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